CLAIMS

1. An integrated magnetostatic wave device, characterized in that it comprises a substrate (1), a conductive ferromagnetic thin film (2) of thickness (e_2) lying in the range about 250 nm to 450 nm and preferably being equal to about 300 nm, said thin film (2) being deposited on said substrate (1), a first transducer antenna (10) for receiving microwave electrical signals disposed parallel to said ferromagnetic thin film (2) in the vicinity thereof in order to create magnetostatic waves or spin waves in said material by inductive coupling, and a second transducer antenna (20) for transmitting microwave electrical signals disposed parallel to said ferromagnetic thin film (2) in the vicinity thereof in order to be inductively coupled thereto and in order to deliver microwave electrical signals on the arrival of a magnetostatic wave in the ferromagnetic thin film (2), said second antenna (20) being situated on the same side of the ferromagnetic thin film (2) as the first antenna (10) so as to be essentially coplanar therewith.

2. A device according to claim 1, characterized in that the ferromagnetic thin film (2) is a magnetic alloy having saturated magnetization greater than or equal to 0.6 T.

3. A device according to claim 1, characterized in that the ferromagnetic thin film (2) is a very soft magnetic alloy such as $Ni_{80}Fe_{20}$.

4. A device according to any one of claims 1 to 3, characterized in that the ferromagnetic thin film (2) is of width (L) of the order of a few tens of micrometers.

5. A device according to any one of claims 1 to 4, characterized in that the distance (e_3) between the ferromagnetic thin film (2) and either of the first and second

transducer antennas (10, 20) is of the order of a few tens to a few hundreds of nanometers.

6. A device according to any one of claims 1 to 5, characterized in that the spacing distance (D) between the first and second transducer antennas (10, 20) lies in the range about 30 μm to about 100 μm and is preferably close to 40 μm.

7. A device according to any one of claims 1 to 6, characterized in that the first and second transducer antennas (10, 20) each comprise a central core (31) and two lateral ground conductors (32, 33) parallel to the central core (31) and situated on either side thereof without making contact therewith.

8. A device according to claim 7, characterized in that the central core presents a width of the order of a few micrometers.

9. A device according to claim 6, characterized in that each of the first and second transducer antennas (10, 20) extends across the entire width (L) of the ferromagnetic thin film (2) and, in the longitudinal direction of said film, occupies a space of width that is less than said spacing distance (D) and lies in the range about 10 μm to about 60 μm.

10. A device according to any one of claims 1 to 9, characterized in that at least one of the first and second transducer antennas (10, 20) is of sinuous shape having a succession of branches extending across the width direction (L) of the ferromagnetic thin film (2).

11. A device according to any one of claims 1 to 10, characterized in that each of the first and second transducer

antennas (10, 20) is of length shorter than one-fourth of the wavelength of the microwaves.

12. A device according to any one of claims 1 to 11, characterized in that the frequency of the microwaves lies in the range about 1 GHz to about 100 GHz.

13. A device according to any one of claims 1 to 12, characterized in that it is made in integrated manner on a semiconductor substrate (1).

14. A device according to any one of claims 1 to 13, characterized in that it includes a third transducer antenna (30) disposed parallel to said ferromagnetic thin film (2) in the vicinity thereof so as to be inductively coupled thereto and deliver microwave electrical signals on the arrival of a magnetostatic wave in the ferromagnetic thin film (2), said third antenna (30) being situated on the same side of the ferromagnetic thin film (2) as the first and second antennas (10, 20) and being interposed in coplanar manner between them.

15. A device according to any one of claims 1 to 14, characterized in that it is applied to a current-controlled attenuator or switch, and in that it further comprises first means (5) for applying a transverse magnetic field (H_A) in the width direction (L) of the ferromagnetic thin film (2), second means (6) for applying a longitudinal magnetic field (H_B) in the length direction of the ferromagnetic thin film (2), and control means for controlling at least one of the first and second means (5, 6) for applying a magnetic field in order to modify selectively the characteristics of the resultant magnetic field (H_R) acting on the ferromagnetic thin film (2).

16. A device according to any one of claims 1 to 14, characterized in that it is applied to an isolator or a circulator, and in that it includes means for directing the

magnetic field applied to the ferromagnetic thin film (2) in such a manner as to obtain non-reciprocity between the first and second transducer antennas (10, 20), a magnetostatic wave signal being conveyed in significant manner only from the first antenna (10) towards the second antenna (20).

17. A device according to claim 1, characterized in that it is applied to a current control switch, in that the conductive ferromagnetic thin film (2) is made of a material presenting cubic anisotropy having a plurality of stable states at resonance, and in that it further comprises means for applying magnetic field pulses in order to cause the thin film to switch from one stable state to the other.